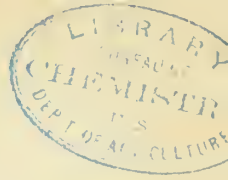


## **Historic, archived document**

Do not assume content reflects current scientific knowledge, policies, or practices.





# Maine Agricultural Experiment Station

BULLETIN No. 123.

DECEMBER, 1905.

## STRAWBERRY CROWN GIRDLER.

---

This bulletin contains notes upon the strawberry crown girdler with preventive and remedial measures; and insect notes for 1905.

---

Requests for bulletins should be addressed to the  
AGRICULTURAL EXPERIMENT STATION,  
Orono, Maine.

MAINE  
 AGRICULTURAL EXPERIMENT STATION  
 ORONO, MAINE.

---

THE STATION COUNCIL.

PRESIDENT GEORGE E. FELLOWS . . . . .	<i>President</i>
DIRECTOR CHARLES D. WOODS . . . . .	<i>Secretary</i>
JOHN A. ROBERTS, Norway . . . . .	} <i>Committee of Board of Trustees</i>
CHARLES L. JONES, Corinna . . . . .	
ALBERT J. DURGIN, Orono . . . . .	
AUGUSTUS W. GILMAN, Foxcroft . . . . .	<i>Commissioner of Agriculture</i>
EUGENE H. LIBBY, Auburn . . . . .	<i>State Grange</i>
CHARLES S. POPE, Manchester . . . . .	<i>State Pomological Society</i>
RUTILLUS ALDEN, Winthrop . . . . .	<i>State Dairymen's Association</i>
JAMES M. BARTLETT . . . . .	} <i>Members of the Station Staff</i>
LUCIUS H. MERRILL . . . . .	
FREMONT L. RUSSELL . . . . .	
WELTON M. MUNSON . . . . .	
GILBERT M. GOWELL . . . . .	
EDITH M. PATCH . . . . .	

THE STATION STAFF.

CHARLES D. WOODS . . . . .	<i>Director</i>
JAMES M. BARTLETT . . . . .	} <i>Chemists</i>
LUCIUS H. MERRILL . . . . .	
HERMAN H. HANSON . . . . .	
LEWIS I. NURENBERG . . . . .	
FREMONT L. RUSSELL . . . . .	<i>Veterinarian</i>
WELTON M. MUNSON . . . . .	<i>Horticulturist</i>
GILBERT M. GOWELL . . . . .	} <i>Poultry Investigations</i>
WALTER ANDERSON . . . . .	
EDITH M. PATCH . . . . .	<i>Entomologist</i>
BESSIE G. LEEDS . . . . .	<i>Microscopist and Photographer</i>
ANNIE M. SNOW . . . . .	<i>Clerk and Stenographer</i>
HENRY A. MILLETT . . . . .	<i>Meteorological Observer and Janitor</i>

STRAWBERRY CROWN GIRDLER. *Otiorhynchus*  
*ovatus*, Linn.

EDITH M. PATCH.

More than a little annoyance has been caused in the State by the strawberry crown girdler, a small, black, snout beetle, noticed in some localities especially for its habit of crowding into the house.

It was the protests of tired housekeepers that drew attention to the beetle last season. "We have been overrun with these hateful pests." "I killed more than 400 one evening in the front room." "They travel all over the house and crawl from baseboard to ceiling only to drop to the carpet and try it over and over again. They hide under any protection, carpet, clothing, bedding, and are a general nuisance." Such reports came from Maysville Center, Houlton, Monson, North Wayne and Caribou during September, June and August. They seemed worthy of some attention and this season observations of the strawberry crown girdler were made with reference to the habit of crowding into houses, habits of larva and adult, and remedial or protective measures.

*The beetles in the house with reference to their out-of-door habits.* The troublesome habit this beetle has of crowding into the house and getting into the way makes it an objectionable insect, although it does no real harm indoors. It feeds upon plants and is therefore, unlike the larder and carpet beetles, interested neither in the food supply of the household nor in clothing and carpets. For the past two years the beetles have occurred in great numbers about the first of June, lasting through that month, and have appeared again in August and September. The house which seems to be troubled most at North Wayne was built in 1822, and as might be expected had crevices near the foundation which offer attractions for insects in search of a hiding place. The beetles were most numerous,

in the front room into which they crept through cracks near the base boards, though they entered the house also at the doorway under the screen. If they were content to be quiet after once finding a hiding place, their presence would be less objectionable, often unsuspected indeed, but their exasperating persistence in "climbing over everything only to drop into everything else" as one housekeeper complained, entitles them to the rank of household pests.

The house at North Wayne was not visited until June 27, 1905, and at this time the beetles were not numerous enough to give sufficient data as to the relation of their house infesting habits to their out-of-door movements. Farther north, however, near Houlton July 5, ample opportunity for observation was afforded. A day's search was made for the adult beetles out of doors. They were not found hiding under planks, stones or other objects in damp places, but in dry soil they were frequently dug up from among the roots of plants. Some of these were newly transformed from the pupal condition and would naturally be found under the surface where the larval period was passed, but others were well hardened specimens which seemed to have sought the roots from above ground, very likely for the deposition of eggs.

Toward the top of a hill along a hot, dusty road more of the beetles were found during the day than elsewhere. The road was bordered by white clover, which may have been significant, for larvæ of the beetles were found at the roots of this plant. The puzzling thing about the beetles here was the fact that they (ordinarily more active during the evening) were wandering restlessly across the road at mid day, under a scorching sun which they were evidently glad to avoid, for every time a leaf or chip was placed near these wanderers they crept underneath and remained there. The question why, if they wanted shelter, they had not apparently found it before mid day, was unsolved until a horse and carriage passed, scattering dry layers of clay with which the road was well supplied at this place. Then disturbed beetles were seen everywhere poking out from crumbled clay bits and walking off in search of another nook in which to finish their nap. More than 200 beetles were captured easily after this disturbance before they had found satisfactory

hiding places. Except when the beetles were moving it was difficult to see them, for though they are black they were too thoroughly dust covered to be detected readily in the roadway.

Toward dusk the hill top road was again visited and this time the beetles were more numerous and more interested in their journey, for they had voluntarily quitted shelter, and were out for purposes of their own. Before dark, beetles were seen everywhere along places where they had been sought in vain during the day; fence rails, piles of sun heated stones, tree trunks, sides of sheds, came in for their share of the active beetles as well as doorway and window sill by which the creatures were entering the house.

These out-of-door observations lead logically enough, it seems, to the conclusion that the house seeking habit of the strawberry crown girdler is merely an incident in the general trend of the movements of this beetle,—perhaps accident would be a more appropriate term from the beetle's standpoint for the house proves a gigantic trap from which the beetles, in spite of restless and persistent climbing, find no means of egress. Like the old fashioned wire fly traps, the house is easier to enter from the foundation than to get out of at the ceiling. The beetles desire a dry shelter and find a building as acceptable as a clump of clay,—until they try to get out.

The restless wanderings of these beetles in and out of the house is probably a necessary impulse for the spread of the species for, unlike many insects, they are incapable of flight and are doomed to walk the earth if the succeeding generations are to find new feeding grounds.

It may not be entirely without interest to question whether the presence of these beetles in houses is augmented by lights as is frequently the case with insects most active at night. At North Wayne the room most troubled was the closed front room where no lights were taken during the evening except for a little while to collect the beetles. Yet in one evening over 400 were killed in this room.

The foregoing discussion has a bearing upon two characteristics commonly accredited this beetle. It is spoken of as "gregarious," and its entrance into houses has been explained as "hibernating."

Certainly these beetles were not observed to show gregarious instincts in the sense of seeking the companionship of others of their kind, but wander about quite indifferent to the direction or destination of their kindred. Of course in places of concentrated local infestation many beetles independently happen upon the same shelter.

If the beetles were found in houses only in the fall their presence might seem a hibernation, but in Maine there are two times when they appear most abundantly,—during June and in August and September, and the June lot are as troublesome in the house as the fall beetles. These two marked periods might seem to indicate two annual broods, but it is difficult to obtain dependable evidence with an insect which is to be found as adults, pupæ and larvæ of various sizes, from early June until fall, as is the case with this beetle in Maine.

*Feeding habits of larvæ.* At North Wayne, late in June, a day was spent in search of larvæ of the strawberry crown girdler. Close to the foundation of the house near the room most troubled by the adults, the roots of a grass, *Poa cerotina*, were found to be freely infested by nearly grown larvæ, and this grass had doubtless supplied a fair proportion of the troublesome beetles. A few pupæ and some newly developed adults, still brown in color, were found among the roots with the larvæ. The main seat of action, however, seemed to be the strawberry bed. The weather had been wet and cold for some time, but in spite of that there were conspicuous wilted places in the bed, here and there. The strawberry plants in these spots could be lifted from the ground with the slightest pull, for their roots were eaten through at a distance of two or three inches from the crown. The appropriateness of the popular name of this beetle was thus approved for the strawberry crowns in this bed were certainly "girdled."

A space containing three square feet was selected at random from one of the wilted places in the bed. More than 200 nearly grown grubs, pupæ, and freshly developed adults of the girdler were found about the strawberry roots in this space, besides which there were one young cut worm and four *Lachnosterna* grubs under half size. How many more there would have been if eight fat predaceous ground beetles had not been skirmishing



through these three square feet of infested soil is a question, depending for its solution upon the capacity of the beetles. It was not surprising to learn, one month later (July 28) that this strawberry bed was more than half dead.

Near Houlton on the place where the beetles were most annoying there was no strawberry bed, and a day was spent examining the roots of meadow plants, July 6, 1905. Larvæ and pupæ of the girdler were found at the roots of wild strawberry, Timothy grass, June grass and white clover. Large potato fields were close at hand, but no signs of the crown girdler were found about potato vines which were dug up in various places in the field.

*Feeding experiments with adult beetles.* Several hundred beetles taken near Houlton early in July were brought to the laboratory for the purpose of testing the range of their food plants. These were confined for three days at a time in bottles containing perfect leaves. The following list records such leaves (or flowers as indicated) as were found to be eaten to a greater or less extent during this time: Apple, cauliflower, red clover (blossom), red clover, woodbine, Tartarian honeysuckle, turnip, radish, white clover (blossom), white clover, rose (petal), oak, dandelion, lettuce, maple leaf, lawn grass, sorrel, timothy grass, basswood, raspberry, mulberry, spirea, currant, strawberry, rose, plantain, celery, mountain ash, Roman wormwood, rhubarb, bean, nasturtium, wolf weed, nightshade, box elder, thistle, cottonwood, elm, geranium, flowering currant, dahlia, syringa, peony, blackberry, fall dandelion, asparagus, horse radish, pea, chickweed, wild cherry, gooseberry, birch, iris, willow, "self heal."

While it is probable that beetles placed in confinement would eat some leaves which in the open they would avoid for other food, still the foregoing test bears out the reputation of this insect as a general feeder.

#### REMEDIAL MEASURES.

*Arsenate of lead.* Two experiments were made with elm leaves (a favorite diet of the girdler) dipped in arsenate of lead, mixed at the rate of 4 pounds to 50 gallons of water. For the first, 42 well fed beetles were confined with a few poisoned leaves for two days, when 18 were dead and 24 still alive. For the second

test 40 beetles were kept without food for 7 days and then confined for 36 hours with poisoned elm leaves. At the end of this time 32 beetles were dead and 8 alive. These tests, especially the second, were arbitrary and unfair with respect to normal out-of-doors conditions because ordinarily the beetles would not be so hungry and there would be unsprayed food within traveling distance. The only significant fact concerned is if they eat sprayed plants they die. In this connection the experience in Montana \* with new strawberry plants dipped in arsenate of lead is exceedingly interesting. It was found in that instance that the beetles avoided the sprayed leaves and began to feed upon the roots of the strawberry.

In view of the great range of food plants accepted by the adult beetles there seems little help to be expected from the application of poison except as it might serve to a certain extent as a protection of valuable plants by causing the beetles to shun them. Mr. R. A. Cooley \* concluded that where adult beetles attacked the leaves badly, spraying was better than no treatment and was worth the cost and trouble incurred. The injury to strawberry beds in Maine, however, has been (so far as known) by the grubs alone, working at the roots, and thus spraying, here, would be of no avail.

*Cultural means.* The fact that grubs (larvæ) of the crown girdler were found during the past season at the roots of grasses, white clover, and wild strawberry merely confirms the evidence of other observers that the larva of this insect finds its natural food in roots of grasses and other meadow plants. Young strawberries set out on newly broken ground already infested with these grubs would of necessity be seriously attacked.

Mr. R. A. Cooley says \* in this connection, "The remedial measure that seems to promise most is so managing the soil that when it is desired to set out the field to strawberries the beetles will have been previously starved out." He also cites the case of a Montana fruit grower who was so troubled by this insect that he abandoned strawberry growing entirely some years ago, using the land for other crops. Strawberry plants were started on this same place in the summer of 1904 and were not troubled at all by these beetles.

\* Montana Agr. Exp. Sta., Bul. 55.

This method is in accordance with preventive means commonly accepted as the only practical way of combating other underground enemies, such as the white grub and the wire worm.

No extended tests have been made in Maine as to what crops would be best adapted for this purpose. At Houlton, however, favorable opportunities for an observation were offered. Potato fields were at hand on newly broken ground adjoining meadows freely infested with grubs of the crown girdler. In two of these fields, the roots of potato vines variously situated were examined and in no case were larvæ of the crown girdler found. This, of course, is no positive indication that potato vines are never attacked by this insect, but the situation of the potato field was exactly such as would have proven the worst possible condition for a strawberry bed; and the apparent freedom of the field from the grubs certainly seems significant.

In localities where the strawberry crown girdler is present to any marked extent, it would be unsafe to set strawberry plants in newly broken land. Some less susceptible crop (the potato would probably serve) should be used first, and the soil so thoroughly cultivated that grass or other weeds cannot remain as a bait for the beetles, or food for such larvæ as chance to be already in the ground.

*Repellents.* As most of the complaints against this beetle in Maine were concerned with its entrance to houses, a few tests were made to see if camphor gum could be used successfully as a repellent to be placed at cracks about baseboards or windows. Between 30 and 40 beetles were placed in a space 6 inches in diameter surrounded by a circle of powdered camphor gum piled about an inch high. The beetles seemed neither stunned nor excited, but walked about in the space and climbed over the camphor apparently indifferently for quarter of an hour when the beetles were taken and buried under a mound of the camphor gum and left for nearly two hours. Shortly after the camphor was removed, the beetles, deliberately stalked off, to all appearances as well as ever. The experiment was repeated with flowers of sulphur with precisely the same results.

At Maysville Center where the beetles in troublesome numbers were entering a house under the baseboard, a liberal application of fresh pyrethrum powder was recommended. The report

came "They do not seem affected one bit by insects powder. They walk right through it and do not mind it at all."

Probably all that can be done to guard against an invasion of the house is to stop the cracks with putty as far as possible and then philosophically to regard these beetles that get in as really harmless. It may be, too, that the beetles will not occur for many years in succession in such large numbers in the places of worst infestation. At North Wayne about 18 years ago there was an outbreak of the same pest which overrun the house for two or three seasons, after which the trouble disappeared, not to come again in conspicuous numbers until the last few years. What natural agencies controlled the situation are quite a matter for surmise.

#### SUMMARY.

*Out of doors.* The strawberry crown girdler in the larval or grub stage feeds upon the roots of grasses and some other plants. Strawberries are especially susceptible to attack and should not be set in, or very near, soil infested by these grubs. The only known practical remedy is clean cultivation. The adult beetles feed upon the leaves of the strawberry and many other plants, and when they are numerous enough to cause much injury, arsenate of lead should be used as a spray.

*In the house.* The presence of great numbers of the beetles in the house is annoying but need cause no real alarm, for they are bent upon no mischief either to persons, clothing or food supplies. Ordinary repellents seem to be of no avail, and probably all that can be done to guard against them is to make the house as tight and beetle proof as possible. With this precaution such beetles as can not be conveniently swept or gathered up, can be tolerated as harmless and transient guests.

## INSECTS OF THE YEAR.

EDITH M. PATCH.

*Tussock moth.* Cocoons of two species of tussock moth, *Notolophus leucostigma* and *N. antiqua*, were received in such numbers during the present year that it is simpler to give them single mention than to list each specimen sent for identification. Most of these cocoons were accompanied by the question "Is this the nest of the brown-tail moth?" In order that further confusion may be avoided to some extent at least, figures 14 and 15 are presented with this comment: The winter nests of the brown-tail moth contain many tiny caterpillars, while the cocoons of the tussock moth are empty during the winter and those from which the females have emerged are covered by a mass of whitish eggs. These egg clusters should be collected and burned.

*Red-humped caterpillars.* There were also too many of the red-humped caterpillars, *Edemasia concinna*, to list in the accompanying table. Between July 29 and October 28, 1905, 81 lots of these caterpillars were received for identification. As only 11 came last year, these insects seem to be on the increase at present. They undoubtedly did great damage in the State this season. Many orchardists reported that entire orchards of young trees were stripped of their foliage, except for the mid ribs of the leaves, before the presence of the pest had been discovered. They are not especially difficult to combat as the broods are gregarious and if found while the caterpillars are young the whole colony can usually be removed with ease. The fact that they come late in the season makes their attacks a surprise oftentimes. Arsenical sprays will kill them, but the presence of ripe fruit sometimes debars the use of poison. There is no difficulty in recognizing this peculiar caterpillar by its red head and conspicuous red band about the body a short distance behind the head. See figure 16.



The yellow-necked caterpillar, *Datana ministra*, seems also to be increasing in this State. During August this species vied with the preceding in troubling orchardists. Means of combatting these two species are identical. See figure 19.

*Tent caterpillars.* The unsightly webs of the tent caterpillar, *Clisiocampa americana*, which had not been numerous for several seasons, were present to a troublesome extent all over the State this spring.

*Stalk borer.* In July and August the stalk borer, *Papaipema nitella*, caused complaint from several localities. The destruction of a crop of sweet corn for two seasons was charged to its account near Gardiner. From Westbrook five specimens of this caterpillar were received with the report: "This pest is destroying my raspberry, blackberry, currant, and gooseberry bushes, corn and dahlia stalks, potato vines and many other kinds of plants, by boring a hole into the plant, usually near the ground but sometimes as many as 30 inches above the surface of the ground, and then eating its way, usually up but sometimes down, until the plant is destroyed."

*Cherry tortrix.* An interesting communication from North Newry late in June gave a description of a "yellowish worm one and a quarter inches long, present by thousands in the grass in the meadow." The owner of the meadow feared a "new grass pest." When specimens were asked for, a mass of grass was sent which was webbed solidly together, and writhing with larvæ of the cherry tortrix, *Cacæcia cerasivorana*. They were not eating the grass and further inquiry elicited the information that they had stripped some wild cherry bushes on the meadow border and then had webbed the grass far into the meadow. About 9 cubic inches of the web was saved and the larvæ pupated, packing it full of pupal cells. On July 10, 119 fresh looking pupæ were counted in this section. During the next few days many moths and a few ichneumons emerged. Brown egg masses were deposited in thin, well varnished layers on the sides of the glass jars and upon leaves, by the imprisoned moths.

*Mourning cloak.* Larvæ of the mourning cloak butterfly, *Euvanessa antiopa*, were reported in destructive numbers from several localities upon elm, willow and apple. Fully half of the caterpillars received at the Station (about 200) were parasited by tachina flies. See figure 20.

*Dotted geometer.* Late in the summer larvæ of the chain dotted geometer, *Cingilia catenaria*, were plentiful upon sweet fern, and large swarms of these beautiful, smoky winged moths were common during the cool autumn days and evenings near Orono and Alfred. See figure 17.

*Snout beetle.* At North Wayne in June an interesting looking bronze gray snout beetle was found in and about a house frequented by the strawberry crown girdler. More of this species were reported from North Wayne during September and one of the specimens was sent Dr. L. O. Howard, chief of the Bureau of Entomology, United States Department of Agriculture, for identification. Dr. Howard kindly replied that the specimen "was identified by Mr. E. A. Schwarz as *Sciaphilus muricatus*, Fab. This species is now referred to *asperatus*. A brief note on its occurrence in Maine with reference to other occurrences in this country is given on p. 272 of vol. VII of Insect Life. It is an introduced species, and some doubt has been expressed by Mr. Schwarz as to its permanent location in this country."

The reference to Insect Life reads as follows:

"During September of the present year a correspondent at Bangor, Me., sent to this office a small lot of a European snout beetle, *Sciaphilus asperatus* Bonsd. (*muricatus* Fab.), which has attracted some little attention in that city. Our correspondent informs us that the beetles gather on the fences, and 'getting on the top rail just cluster and keeping still seem to enjoy life.' They have a singular habit of 'piling up on each other in a straight line, many at once and in many small groups.' They were not, however, observed to be copulating. This unusual gathering took place during the first of September and was preparatory to hibernation.

"The first notice of the occurrence of this insect in North America is by Mr. Samuel Henshaw, published in 1888 in *Psyche* (vol. V, p. 137). The insect was collected at Brookline, Mass., by Mr. F. C. Bowditch, on *Populus balsamifera*. In the *Canadian Entomologist* (vol. XXIII, pp. 23, 114, 1891) Mr. W. H. Harrington reports this species at Sydney, Cape Breton, Nova Scotia. It was found in 1884 and 1890 and was not uncommon. In the National Museum collection there are also specimens from Malden and one other locality in Massa-

chusetts, and Mr. M. L. Linell informs me that he has taken a specimen near Brooklyn, L. I.

“It will be noticed that although the species was known to have been introduced at least ten years ago, that it is still limited to districts near the seashore. Like other allied wingless species that have been introduced from Europe it will probably not extend its range much farther south, but will move gradually westward from the points where it has now established itself. It is a common European species and is known to feed on a great variety of deciduous trees and shrubs, and though it is impossible to forecast the future it is not probable that it will ever be particularly injurious to cultivated plants in this country.—F. H. C.”

As the foregoing account was written some ten years ago, data concerning this season's collection in Maine may be of interest.

On June 20, 1905, a correspondent wrote a vigorous protest against beetles in her house and stated “there are two kinds of bugs, but more of the black than the gray ones.” Both kinds were reported to have been very numerous for two years in June and again in the fall. Specimens accompanied the letter and the black ones proved to be the strawberry crown girdler, while the gray ones were the species recently identified by Mr. Schwarz as *Sciaphilus asperatus* Bousd. (*muricatus* Fab.)

At North Wayne on June 27 seven of this species were collected at dusk climbing the foundation of the house and a few more were taken inside the dwelling.

Between 20 and 30 of these beetles were collected by the North Wayne correspondent September 11, and sent to the Station with the information: “I found all I send on my dahlia blossoms. There are none in the house now but I find them out of doors on 'most everything though not very thick.”

It would seem that this imported snout beetle has not yet lost its hold. No other specimens of *Sciaphilus asperatus* are recorded at the Station this season, except a single specimen collected at Orono, August 8, 1905.

*Rose chafer.* On June 28, the vicinity of North Wayne and Kent's Hill was observed to be invaded by the rose chafer, *Macrodactylus subspinosus*. Willows and alders had been eaten to the greatest extent, though wild blackberry bushes were



stripped here and there. The rose bushes did not happen to be attacked badly at that date. One alder clump composed of five stems none of which was six feet high presented a peculiar appearance with every leaf skeletonized and dangling with pairing beetles. From this single clump 1,315 chafers were collected and then the task of clearing the bush was abandoned as hopeless. Twenty leaves were then picked at random and from one to three pairs of chafers were still clinging to each.

About this time specimens of the rose chafer were received from Mt. Vernon with the complaint that some of the orchard trees were covered with them. Several apples about one inch in diameter, accompanying this communication, were tunnelled to the core by the chafers which were gorged and sticky with the repast. See figure 21.

A report from West Peru stated that a whole orchard had been stripped. Early in July from East Sumner a correspondent wrote that for three years the rose chafer had done great damage to orchards, berry bushes and gardens, "about ruining everything they touch."

*Carpet beetle.* Early in June carpet beetles, *Anthrenus scrophularius*, were seen commonly upon rhubarb and horse radish blossoms at Orono. June 9, they seemed especially numerous and a half day's collection was made from one rhubarb bed during which time 156 of these beetles were taken. As they were also on polliniferous flowers which are gathered for house decoration, it is advisable to be on the watch for these beetles in picking flowers in order to make sure that none are carried into the house in this way. The adult beetles are pollen eaters but the young, as is known well enough, are among the most troublesome of household pests.

*Flea beetle.* About June 6, several species of flea beetles were much in evidence at Orono. The cucumber flea beetle, *Epitrix cucumeris*, had riddled the leaves of potato vines. A striped flea beetle, *Phyllotreta vittata*, was present especially on horse radish, and bronze flea beetles were conspicuous upon rhubarb and other plants.

*Wire worms.* As the present season brought an unusual number of complaints against wire worms, the following statements in regard to these insects were published as a newspaper bulletin.

Wireworms are slender grubs of yellowish white color and very hard bodies. They are the young (larvæ) of click-beetles, or snapping beetles, so called from the fact that when placed upon their backs they will suddenly bend the body and, with a sharp clicking sound, throw themselves a considerable distance into the air. They are among the most troublesome of crop pests and as they live underground it is difficult to combat them.

At the New York, Cornell, Agricultural Experiment Station, exhaustive experiments covering a period of three years were made for the purpose of testing remedial measures. The statements here made are based largely upon the results of those experiments. Many methods that had previously been recommended for the destruction of these pests were found to be inefficient. To cite but one example: It was found that the wire worms were still alive in soil to which salt enough had been applied to kill the vegetation.

One method, especially approved, was fall plowing. The explanation of the beneficial results that follow fall plowing is believed to be found in the following facts. Wire worms live for at least three years in the worm or larval state. When the worms are full grown they change to soft white pupæ during July. The pupal stage lasts only about three weeks, the insect assuming the adult form in August. But, strange to say, although the adult state is reached at this time, the insect remains in the cell in the ground till the following April or May, nearly a year. This period of quiescence is apparently necessary to the life of the beetle, for in every case where the soil was disturbed after the insects had transformed, the beetles perished. By fall plowing we can destroy the beetles in the soil and thus prevent their depositing eggs the following season. After plowing (at least six inches deep) the soil should be well pulverized and kept stirred so that the earthen cells of the pupæ and adults may be destroyed. It will usually require at least three years to render the soil comparatively free from wire worms, as only the pupæ and adults are killed, the young larvæ remaining uninjured.

*Nematode worm.* Late in November specimens of diseased gardenia from one of the nurseries in the State were received at this Station. The trouble seemed to be caused neither by insect or fungus attack and the material was sent to the United States

Department of Agriculture, Bureau of Plant Industry, for examination. Mr. C. O. Townsend, acting pathologist and physiologist of that bureau, stated the trouble to be due to nematode worms.

Although worms are not insects, the nature of their attack and the remedies applied bring them into a closer relation with work pertaining to insects than any other department of the Station, and a record of this case is included with notes on insects.

As Mr. Townsend's letter is of interest and as the preventative means he recommended apply with equal force to millipedes, concerning which complaints from greenhouses frequently reach the station, the letter is quoted in full:

"The swellings on the roots were caused by the root-knot nematode, *Heterodera radicolica*. These swellings, after the nematodes have reached maturity and laid their eggs, decay and bring about thus the death of the plant. They also reduce the vigor of the plant before the period of decay is reached by checking the water supply and diminishing the root growth.

"There is no certain method known by which the nematodes can be killed in the roots of this plant without injury to the plant itself. Experiments were conducted at Washington some years ago with roses badly infested with nematodes, using a 1-per cent solution of formalin. This proved effective in destroying the pests and, although it caused the shedding of the leaves, did not kill the rose plants. Whether similar treatment would be destructive to the gardenia plants or not can be determined only by experiment. The plants should be hardened off somewhat for a week or two before the experiment is made.

"The trouble can be avoided by sterilizing the soil in which the plants are to grow and then using only such plants as are absolutely free from any signs of root-knot. This sterilization can best be effected, as described in bulletin No. 55 of the Hatch Experiment Station, by the use of live steam from a boiler with a pressure of 40 to 60 pounds. This is conducted through perforated pipes laid in the bottoms of the benches, the steam being passed into the soil until it has all been heated to the temperature of boiling water. This suffices to kill not only the nematodes but also various destructive fungi."

*Tarnished plant bug.* The tarnished plant bug was present in the usual numbers this season and during the spring caused

considerable injury to opening leaf and flower buds by puncturing the buds, which resulted in deformed growth.

*Plant lice.* Serious injuries were caused by plant lice in different parts of the State. Perhaps the most important of these this season were injuries to cucumber vines, several beds being entirely ruined. Where the plants were small enough, however, to cover, bisulphide of carbon was recommended and this treatment met with entire success. It is not a difficult remedy to apply and the gardeners who used it were pleased with the results.

For the past two seasons enormous numbers of plant lice have appeared upon the potato vines near Houlton, working both on the stalks and on the under side of the flower leaves.

As usual where plant lice are numerous, complaints against ants and lady beetles are frequent. "Ants have attacked our woodbine and caused the leaves to wilt," and specimens of lady beetles sent in with the report "these are completely devastating cucumber patches," or "ruining a small ash tree," are examples of this all too common mistake. When ants are seen running over plants it is usually for the purpose of sipping a sweet fluid exuded by the plant lice and not to injure the plant. It is especially unfortunate that larval lady beetles are not more generally recognized, because they are among the most active of the natural checks upon plant lice, devouring great numbers of them.

Nearly 80 collections of plant lice were made during the summer, most of them near Orono. It was interesting to notice that though this family of insects was everywhere abundant the past two seasons the species most common in 1904 were not so much in evidence in 1905 as different species. A fuller and more definite record of this material is reserved for future discussion.

The natural checks which seemed to be most effective in connection with the observed species of plant lice, were Syrphus flies, lady beetles, predaceous Capsidæ, and parasites of the genus *Aphidius*.

*Garden flea.* At the time garden plants were just starting, about the first of June, garden fleas, *Smynturus albamaculata* Harvey, were to all appearances guilty of real havoc in Orono gardens. Myriads of the tiny creatures occurred on the tender

young leaves of lettuce, beans, cucumbers and squash and other plants which were at the time quite free from other insect guests. They worked round cavities in the soft leaves (usually from the under side, but not infrequently from the upper) reaching into the soft tissues, but not piercing quite through both surfaces of the leaf. The plants attacked were much damaged.

*Apple maggot.* There seems little to be said about the apple maggot for 1905 except that there is no apparent change in the general situation. It is at least not increasing in extent of injury in Maine.

*Brown-tail moth.* By far the most serious insect problem for Maine at present is the brown-tail moth. An account of this destructive and distressing pest was published last year.\* A discussion of the moth and a history of the campaign against it has recently been ably presented in Bulletin of the Department of Agriculture of Maine, Vol. IV, No. 4, as a report of Hon. A. W. Gilman, Commissioner of Agriculture, and Mr. E. F. Hitchings, Entomologist. It hardly seems necessary here, therefore, to do more than touch upon the work of this Experiment Station in connection with the situation. Previous to the State appropriation for protection against insect ravages, the State Pomological Society expressed a helpful interest in the matter, and the Experiment Station worked in co-operation with the Commissioner of Agriculture in ascertaining the extent of infestation. This co-operation was continued during the spring of 1905, the Station locating infested areas in the counties of York, Cumberland, Androscoggin, Sagadahoc, Kennebec, Lincoln, Knox, Waldo, and Hancock. Station bulletins and other printed matter concerning the brown-tail moth and the danger involved were scattered broadcast over the State.

Whenever the infestation was discovered, the town or local authorities earnestly used every means within their power to inform the people of the danger and incite them to the destruction of the nests. So thoroughly was the work done that for the season just over, no appreciable loss has been experienced in Maine from the brown-tail moth and only a few cases of poisoning have been reported. It is not to be understood, however, that anything approaching an extermination has taken place. Scattered nests in wild growths remained to form new centers

\* Me. Exp. Sta., Bul. 108.



of infestation and alarming invasions of the winged moths from neighboring states occurred during the past summer. This year, no less than last, Maine is confronted with a serious menace to the orchard and woodlands, to the attraction of summer resorts, and to the health and comfort of the people; and the neglect of the situation now means a gigantic financial problem for later years to meet.

*Insect legislation.* Until 1905 no state appropriations had been made in Maine to provide for the protection of trees and shrubs from the introduction and ravages of dangerous insects and diseases. The alarming invasion of the brown-tail moth during 1903 and 1904 emphasized the need of legislation relating to such matters, and on February 28, 1905, a protection act was passed. This act provides for the inspection of nurseries in the State and of nursery stock shipped into the State, by a competent entomologist to be employed by the Commissioner of Agriculture; and places with the Commissioner of Agriculture the duty of making full investigations of any locality when the presence of the brown-tail or gypsy moths or other injurious insects or plant diseases may be suspected.

A copy of this act may be procured by applying to the Commissioner of Agriculture, Augusta, Me., in whose hands the matter rests.

#### LIST OF INSECTS RECEIVED.

A partial list of the insects received at this Station for identification from January 1 to December 1, 1905, is given on the following pages.

INSECTS RECEIVED FOR IDENTIFICATION.

Name.	Date.	Host.	Locality.	Remarks.
Fuller's rose beetle, <i>Aramiges fulleri</i> .....	Jan.	Tuberous begonia.....	Ellsworth.....	Larvæ troublesome in greenhouse.
<i>Chrysomela multiguttata</i> .....	May	Linden.....	Portland.....	Adults numerous.
<i>Scirca sericea</i> .....	June	Strawberry.....	Indian River.....	Adults devouring the leaves, numerous.
Strawberry crown girdler, <i>Otiorynchus ovatus</i> .....	June	.....	Wayne.....	Great numbers in house.
Strawberry crown girdler, <i>Otiorynchus ovatus</i> .....	June	.....	Caribou.....	Great numbers in house.
Strawberry crown girdler, <i>Otiorynchus ovatus</i> .....	June	.....	Maysville Centre.....	Great numbers in house.
Strawberry crown girdler, <i>Otiorynchus ovatus</i> .....	June	.....	Monson.....	Great numbers in house.
Rose chafer, <i>Macrodactylus subspinosus</i> .....	July	Apple plum.....	West Peru.....	Stripped the orchard.
Rose chafer, <i>Macrodactylus subspinosus</i> .....	July	1 Blackberry, elm and others.....	East Summer.....	Very troublesome.
Rose chafer, <i>Macrodactylus subspinosus</i> .....	June	Apples.....	Mt. Vernon.....	Apples eaten to the core.
Lady beetles,.....	July	.....	Belfast.....	Larvæ numerous on ash, feeding on plant lice.
Lady beetle,.....	Aug.	.....	Portland.....	Larvæ feeding on plant lice on poppy.
Lady beetle, <i>Coccinella 5-notata</i> .....	Aug.	.....	Lewiston.....	Numerous on cucumber vines.
Saw-toothed grain beetle, <i>Sitona surinamensis</i> .....	July	Flour and starch.....	Richmond.....	Larvæ.
Tortoise beetle, <i>Chelymorpha argus</i> .....	July	.....	Lisbon Falls.....	Pupæ and adults numerous.
Tortoise beetle, <i>Chelymorpha argus</i> .....	Aug.	Raspberries.....	Stroud water.....	.....
Bean weevil, <i>Bruchus obtectus</i> .....	July	Dogbane.....	Bethel.....	.....
.....	Aug.	.....	Searsport.....	.....
.....	Aug.	.....	Winneganee.....	Adult.
White pine weevil, <i>Pissoides strobi</i> .....	Aug.	Pine.....	Bar Harbor.....	Destroying leading shoot.
Round-headed apple tree borer, <i>Saperda candida</i> .....	Sept.	.....	Solon.....	Adult reported to be feeding on apple leaves.
.....	Sept.	Apple.....	.....	Adults destroyed about 100 grafts in apple trees.
Bumble flower-beetle, <i>Euphoria inda</i> .....	Oct.	Apple.....	South Bridgton.....	.....
Wire worms,.....	Nov.	Potato.....	Newport.....	Larvæ very troublesome.
Wire worms,.....	Oct.	Potato.....	Clinton.....	Larvæ very troublesome.
Wire worms,.....	May	Onion.....	Lee.....	Larvæ very troublesome.
Eyed elater, <i>Alaus oculatus</i> .....	June	.....	Corinna.....	Adult.
Leaf-rolling weevil, <i>Attelabus sp.</i> .....	Aug.	Alder.....	Gardiner.....	Packets on leaf.
.....	June	.....	North Wayne.....	Adults in house.
.....	June	.....	North Wayne.....	Adults in blossoms.
.....	Sept.	Dahlia.....	South Berwick.....	Nests numerous.
Brown-tail moth, <i>Euproctis chrysotheca</i> .....	Feb.	.....	Bowdoin.....	Nest.
Br wn-tail moth, <i>Euproctis chrysotheca</i> .....	Feb.	.....	Portland.....	Nests.
Brown-tail moth, <i>Euproctis chrysotheca</i> .....	Feb.	Apple.....	Lincolnville.....	Nest.
Brown-tail moth, <i>Euproctis chrysotheca</i> .....	March	.....	Kittery Point.....	Nests numerous.
Brown-tail moth, <i>Euproctis chrysotheca</i> .....	March	.....	West Scarborough.....	Nest.
Brown-tail moth, <i>Euproctis chrysotheca</i> .....	March	.....	Vinalhaven.....	Nests in great numbers.
Brown-tail moth, <i>Euproctis chrysotheca</i> .....	April	Apple, plum, birch.....	.....	.....

## INSECTS RECEIVED FOR IDENTIFICATION—CONTINUED.

Name.	Date.	Host.	Locality.	Remarks.
Brown-tail moth, <i>Euproctis chrysorrhæa</i> .....	May	19 Plum	Maxfield	Nest containing 183 living caterpillars.
Brown-tail moth, <i>Euproctis chrysorrhæa</i> .....	June	1	East Jefferson	Nest.
Brown-tail moth, <i>Euproctis chrysorrhæa</i> .....	July	29	Bar Harbor	Egg mass.
Cherry tree tortrix, <i>Caccacia cerasisvorana</i> .....	June	26 Wild cherry	North Newry	Larvæ webbing grass.
Cherry tree tortrix, <i>Caccacia cerasisvorana</i> .....	July	1 Wild cherry	Palmira	Larvæ.
Cherry tree tortrix, <i>Caccacia cerasisvorana</i> .....	July	3 Wild cherry	North Monmouth	Larvæ.
Cherry tree tortrix, <i>Caccacia cerasisvorana</i> .....	July	10 Wild cherry	Greenville	Larvæ.
Cherry tree tortrix, <i>Caccacia cerasisvorana</i> .....	July	17	Gardiner	Larvæ.
Stalk borer, <i>Papaipema nitela</i> .....	July	7 Corn	Gardiner	Larvæ ruining corn stalks.
Stalk borer, <i>Papaipema nitela</i> .....	July	7 Strawberry	Sanford	Larvæ buried in fruit. Trouble.
Stalk borer, <i>Papaipema nitela</i> .....	July	15 Sweet corn	Gardiner	some.
Stalk borer, <i>Papaipema nitela</i> .....	July	27 Corn, potato, dahlia	Westbrook	Spoiled sweet corn for two seasons.
Stalk borer, <i>Papaipema nitela</i> .....	Aug.	10 Potato	Portland	Devastating garden.
Thysbe clearwing, <i>Hemaris thysbe</i> .....	July	1	Vinalhaven	Working hayoc in stalks.
Galium sphinx, <i>Delilephila chamæneris</i> .....	July	3	Athens	Adult.
Virginian tiger moth, <i>Spilosoma virginica</i> .....	July	3	Abbot	Adult.
Salt-marsh caterpillar, <i>Estigmene acrea</i> .....	July	3	Winterport	Adult.
Unicorn prominent, <i>Schizura unicoloris</i> .....	Sept.	6 Apple	Lisbon Falls	Larvæ.
....., <i>Sabulodes transversata</i> .....	Sept.	12 Apple	Lewiston	Larvæ.
Scalloped-shell geometer, <i>Catoctipe undulata</i> .....	Sept.	18	Kezar Falls	Larvæ.
Codling moth, <i>Carpocapsa pomonella</i> .....	March	17	Brooklin	Adult.
Oblique-banded leaf roller, <i>Caccacia rosana</i> .....	June	13 Apple	Newport	Larvæ in great numbers.
Gray comma, <i>Grapta progne</i> .....	June	16 Currant	Lowell	Larvæ plentiful.
Laurel sphinx, <i>Sphinx kalmie</i> .....	July	15 Gooseberry	Ashland	Parasited larva.
Laurel sphinx, <i>Sphinx kalmie</i> .....	June	16	Solon	Adult.
Laurel sphinx, <i>Sphinx kalmie</i> .....	June	29	Skowhegan	Adult.
Green apple leaf-ter, <i>Teras minuta</i> .....	July	8	Skowhegan	Adult.
Canker worm, <i>Anisopteryx pomataria</i> .....	June	21 Apple	Houlton	Larvæ.
Mourning cloak butterfly, <i>Evanessa antiopa</i> .....	June	21 Apple	Houlton	Larvæ.
Mourning cloak butterfly, <i>Evanessa antiopa</i> .....	July	24 Elm	Portland	Larvæ.
Mourning cloak butterfly, <i>Evanessa antiopa</i> .....	July	1	Berwick	Larvæ.
Mourning cloak butterfly, <i>Evanessa antiopa</i> .....	July	24	North Monmouth	Larvæ.
Mourning cloak butterfly, <i>Evanessa antiopa</i> .....	July	24	Greenville	Parasited larva.
Mourning cloak butterfly, <i>Evanessa antiopa</i> .....	July	26 Elm	Harrison	Larvæ.
Mourning cloak butterfly, <i>Evanessa antiopa</i> .....	July	29 Elm	Lee	Larvæ.
Mourning cloak butterfly, <i>Evanessa antiopa</i> .....	Aug.	3 Balm gilead	Wells	Larvæ.
Mourning cloak butterfly, <i>Evanessa antiopa</i> .....	Aug.	7 Poplar	North Monmouth	Larvæ.
Mourning cloak butterfly, <i>Evanessa antiopa</i> .....	Sept.	16	Auburn	Larvæ.



## INSECTS RECEIVED FOR IDENTIFICATION—CONTINUED.

Name.	Date.	Host.	Locality.	Remarks.
Apple sphinx, <i>Sphinx gordius</i> .....	Aug.	Apple.....	Lewiston.....	Larva full grown.
Achometa sphinx, <i>Philaeneta achemon</i> .....	Aug.	Woodbine.....	Waterville.....	Larva.
Promethes moth, <i>Catlosamita promethea</i> .....	Feb.		Kennebunkport.....	Cocoons, common
Cecropia moth, <i>Samia cecropia</i> .....	March		South Paris.....	Cocoon.
Cecropia moth, <i>Samia cecropia</i> .....	April		Greene.....	Cocoons.
Cecropia moth, <i>Samia cecropia</i> .....	April	Apple.....	Jay.....	Cocoon.
Cecropia moth, <i>Samia cecropia</i> .....	April	Pear.....	Wisasset.....	Cocoon.
Cecropia moth, <i>Samia cecropia</i> .....	May		Ripley.....	Cocoon.
Cecropia moth, <i>Samia cecropia</i> .....	May		Skowhegan.....	Cocoon.
Cecropia moth, <i>Samia cecropia</i> .....	May		Abbot.....	Cocoon.
Cecropia moth, <i>Samia cecropia</i> .....	June		North Anson.....	Cocoon.
Cecropia moth, <i>Samia cecropia</i> .....	July		Detroit.....	Male.
Cecropia moth, <i>Samia cecropia</i> .....	July	Apple.....	Harrison.....	Cocoon.
Cecropia moth, <i>Samia cecropia</i> .....	Aug.		Har Harbor.....	Larva full grown.
Cecropia moth, <i>Samia cecropia</i> .....	Aug.		Newport.....	Larva full grown.
Cecropia moth, <i>Samia cecropia</i> .....	Oct.		Dryden.....	Cocoon.
Cecropia moth, <i>Samia cecropia</i> .....	Oct.		Buckfield.....	Cocoon.
Swallow-tail butterfly, <i>Papilio polyxenes</i> .....	March		South Paris.....	Chrysalis.
Swallow-tail butterfly, <i>Papilio polyxenes</i> .....	July	Parsnip.....	Brunswick.....	Larva.
Tiger swallow-tail, <i>Papilio turnus</i> .....	Aug.	Apple.....	Belgrade Lakes.....	Larva.
Tiger swallow-tail, <i>Papilio turnus</i> .....	Sept.		Hutchins.....	Larva.
Tiger swallow-tail, <i>Papilio turnus</i> .....	Aug.		Dover.....	Larvæ.
Polyphemus moth, <i>Telea polyphemus</i> .....	May	Apple.....	South Paris.....	Cocoon.
Polyphemus moth, <i>Telea polyphemus</i> .....	July		Gardiner.....	Male.
Polyphemus moth, <i>Telea polyphemus</i> .....	July		Olanou.....	Male.
Polyphemus moth, <i>Telea polyphemus</i> .....	Sept.		Gorham.....	Cocoon.
Tent caterpillar, <i>Clistocampa americana</i> .....	May		North Penobscot.....	Eggs.
Tent caterpillar, <i>Clistocampa americana</i> .....	May	Apple.....	Bar Harbor.....	Nest and larvæ.
Tent caterpillar, <i>Clistocampa americana</i> .....	June		Mechanic Falls.....	Old cocoon.
Tent caterpillar, <i>Clistocampa americana</i> .....	July		Foxcroft.....	Male.
Tent caterpillar, <i>Clistocampa americana</i> .....	Aug.		North Monmouth.....	Egg cluster.
Tent caterpillar, <i>Clistocampa americana</i> .....	Aug.		East Lowell.....	Egg cluster.
Tent caterpillar, <i>Clistocampa americana</i> .....	Aug.		East Holden.....	Egg cluster.
Tent caterpillar, <i>Clistocampa americana</i> .....	Sept.		West Troy.....	Egg cluster.
Tent caterpillar, <i>Clistocampa americana</i> .....	Sept.		Skowhegan.....	Egg cluster.
Tent caterpillar, <i>Clistocampa americana</i> .....	Sept.		Unity.....	Egg cluster.
Tent caterpillar, <i>Clistocampa americana</i> .....	Oct.		Monmouth.....	Egg cluster.
Hickory tiger moth, <i>Hatistota caryti</i> .....	July	Apple.....	Springvale.....	Larvæ.

## INSECTS RECEIVED FOR IDENTIFICATION—CONTINUED.

Name.	Date.	Host.	Locality.	Remarks.
Hickory tiger moth, <i>Halisidota caryii</i> .....	July	Apple.....	Greene.....	Larvæ.
Hickory tiger moth, <i>Halisidota caryii</i> .....	Aug.	Apple.....	Charleston.....	Larvæ.
Hickory tiger moth, <i>Halisidota caryii</i> .....	Aug.	Apple.....	Dexter.....	Larvæ.
Chain-dotted geometer, <i>Cingilia catenaria</i> .....	Aug.	Sweet fern.....	Dayton.....	Larvæ very numerous.
Chain-dotted geometer, <i>Cingilia catenaria</i> .....	Aug.	Sweet fern.....	Lyman.....	Larvæ very numerous.
Chain-dotted geometer, <i>Cingilia catenaria</i> .....	Aug.	Sweet fern.....	Alfred.....	Larvæ very numerous.
Chain-dotted geometer, <i>Cingilia catenaria</i> .....	Oct.	Apple.....	Alfred.....	Moths flying about sweet fern.
Fall web worm, <i>Hypphantria cunea</i> .....	Aug.	Apple.....	Kent's Hill.....	Larvæ.
Fall web worm, <i>Hypphantria cunea</i> .....	Aug.	Apple.....	Kennebunk.....	Larvæ.
Dagger moth, <i>Apateia lepusculina</i> .....	Aug.	Poplar.....	Dexter.....	Larvæ.
Skiff slug caterpillar, <i>Eulimacodes scapha</i> .....	Aug.	Apple.....	Foxcroft.....	Larvæ.
To moth, <i>Automeris io</i> .....	Aug.	Apple.....	West Buxton.....	Larvæ.
To moth, <i>Automeris io</i> .....	Sept.	Apple.....	Westbrook.....	Larvæ, "Pest on delicate garden plants,"
Mediterranean flour moth, <i>Ephesia kuehniella</i> .....	Oct.	Echinops.....	Gardiner.....	Reared in laboratory.
Thistle butterfly, <i>Pyramis cardui</i> .....	July	Ash.....	Bar Harbor.....	Larvæ troublesome in nursery.
Cheris sphinx, <i>Hyloicus chersis</i> .....	Aug.	Birch.....	Fort Fairfield.....	Larvæ.
American lappet moth, <i>Phylodesma americana</i> .....	July	Black walnut.....	North Monmouth.....	Larvæ.
Argynnis cybele, <i>Argynnis cybele</i> .....	July	Apple.....	Gerry.....	Adult.
Velleda lappet moth, <i>Toiype vellela</i> .....	July	Black walnut.....	South Berwick.....	Larvæ.
Walnut caterpillar, <i>Datana angusii</i> .....	Aug.	Apple.....	Harrison.....	Larvæ.
Yellow-necked caterpillar, <i>Datana ministra</i> .....	July	Apple.....	Ellot.....	Larvæ.
Yellow-necked caterpillar, <i>Datana ministra</i> .....	Aug.	Apple.....	Litchfield.....	Larvæ.
Yellow-necked caterpillar, <i>Datana ministra</i> .....	Aug.	Hazel.....	Gardiner.....	Larvæ.
Yellow-necked caterpillar, <i>Datana ministra</i> .....	Aug.	Apple.....	Mechanic Falls.....	Larvæ.
Yellow-necked caterpillar, <i>Datana ministra</i> .....	Aug.	Apple.....	Fairfield.....	Larvæ.
Yellow-necked caterpillar, <i>Datana ministra</i> .....	Aug.	Apple.....	South Paris.....	Larvæ.
Yellow-necked caterpillar, <i>Datana ministra</i> .....	Aug.	Apple.....	Wales.....	Larvæ.
Yellow-necked caterpillar, <i>Datana ministra</i> .....	Aug.	Apple.....	Litchfield.....	Larvæ.
Yellow-necked caterpillar, <i>Datana ministra</i> .....	Aug.	Apple.....	Foxcroft.....	Larvæ.
Yellow-necked caterpillar, <i>Datana ministra</i> .....	Aug.	Apple.....	East Lowell.....	Larvæ.
Yellow-necked caterpillar, <i>Datana ministra</i> .....	Aug.	Apple.....	Sabatius.....	Larvæ.
Yellow-necked caterpillar, <i>Datana ministra</i> .....	Aug.	Apple.....	Vassalboro.....	Larvæ.
Yellow-necked caterpillar, <i>Datana ministra</i> .....	Aug.	Apple.....	Springvale.....	Larvæ.
Yellow-necked caterpillar, <i>Datana ministra</i> .....	Aug.	Apple.....	Ross Corner.....	Larvæ.
Yellow-necked caterpillar, <i>Datana ministra</i> .....	Aug.	Apple.....	North Anson.....	Larvæ.
Yellow-necked caterpillar, <i>Datana ministra</i> .....	Sept.	Apple.....	Lee.....	Larvæ.

INSECTS RECEIVED FOR IDENTIFICATION—CONTINUED.

Name.	Date.	Host.	Locality.	Remarks.
Yellow-necked caterpillar, <i>Datana ministra</i> .....	Sept. 1		North Jay.....	Larvæ.
Yellow-necked caterpillar, <i>Datana ministra</i> .....	Sept. 1		Skowhegan.....	Larvæ.
Yellow-necked caterpillar, <i>Datana ministra</i> .....	Sept. 4		East Waterford.....	Larvæ.
Yellow-necked caterpillar, <i>Datana ministra</i> .....	Sept. 6		Summer.....	Larvæ.
Scalloped owl moth, <i>Scotiopteryx libatrix</i> .....	April 5		Augusta.....	Adult.
White marked tussock moth, <i>Notolephus leuco stigma</i> *.....				
Old tussock moth, <i>Notolephus antiqua</i> .....				
Red-humped caterpillars, <i>Eudemasia conchuna</i> *.....				
Elm leaf curl, <i>Schizoneura americana</i> .....	Feb. 16	Elm.....	Presque Isle.	
Elm leaf curl, <i>Schizoneura americana</i> .....	March 4	Elm.....	Alfred.	
Elm leaf curl, <i>Schizoneura americana</i> .....	April 1	Elm.....	Norridgewock.	
Elm leaf curl, <i>Schizoneura americana</i> .....	June 23	Elm.....	Gardiner.	
Elm leaf curl, <i>Schizoneura americana</i> .....	March 20	Asters.....	Gardiner.....	On roots; very destructive.
Plant lice, .....	July 1	Cucumbers.....	West Bath.....	Vines ruined for two years.
Plant lice, .....	Aug. 18	Cucumber.....	Portland.....	Ruining the bed.
Plant lice, .....	Aug. 18	Poppy.....	Portland.	
Plant lice, .....	Aug. 18	Rhubarb.....	Portland.....	
Plant lice, .....	Aug. 19	Apple.....	Newport.	Especially troublesome.
Plant lice, <i>Pemphigus rhots</i> .....	Sept. 12	Sumach.....	East Holden.....	Galls numerous.
Plant lice, <i>Pemphigus</i> .....	Sept. 14		Castine.....	Numerous on the wing.
Alder blight, <i>Pemphigus tessellata</i> .....	Aug. 21	Alder.....	South Orrington.....	Conspicuous infestation.
Apple aphid, <i>Aphis mali</i> .....	Oct. 23	Apple.....	Kezar Falls.....	Adults and eggs.
Woolly louse of the apple, <i>Schizoneura lanigera</i> .....	Oct. 14	Apple.....	South Thomaston.	
<i>Pemphigus acerifolii</i> .....	July 13		Alfred.....	Winged forms, "present by thousands."
<i>Pemphigus acerifolii</i> .....	July 14	Maple.....	Kennebunk.....	Several localities infested.
<i>Pemphigus acerifolii</i> .....	July 27	Maple.....	Bar Harbor.....	
Oyster shell scale, <i>Mittaspis pomorum</i> .....	April 13	Cornus.....	Winter Harbor.....	Killing big branches.
Scale, <i>Aspidiotus</i> .....	June 20	Bay laurel.....	Bar Harbor.	
Scale, <i>Lecanium</i> .....	June 20	Apple.....	Lincoln.	
Morgan's scale, <i>Chrysomphalus dictyospermi</i> .....	July 14		Bar Harbor.	
Cottony maple scale, <i>Pseudococcus aceris</i> .....	Aug. 8	Maple.....	Sanford Mills.....	Great numbers.
Garden flea hopper, <i>Halticus uhleri</i> .....	July 27	<i>Clematis virginiana</i> and <i>Clematis vitalba</i> .....	Bar Harbor.	

\* See discussion under "Insects of the Year" in this bulletin.

## INSECTS RECEIVED FOR IDENTIFICATION—CONCLUDED.

Name.	Date.	Host.	Locality.	Remarks.
Tarnished plant-bug, <i>Lygus pratensis</i> .....	May	2 Pear .....	Harrison.....	On buds of young pear tree. Num- erous.
....., <i>Dog-day cicada</i> .....	July	17 .....	Vanceboro .....	Pupa.
....., <i>Cercopids</i> .....	Aug.	12 Garden plants.....	Portland.....	On flower and leaves in garden. Caused buds to drop.
Giant water bug, <i>Belostoma americana</i> .....	Oct.	7 .....	Pittsfield.	
Horn-tail, <i>Urocerus albicornis</i> .....	Aug.	30 .....	Lewiston.....	Female.
Giant saw-fly, <i>Cimbex americana</i> .....	Aug.	8 .....	Ellsworth.....	Larva.
Giant saw-fly, <i>Cimbex americana</i> .....	Aug.	11 Elm.....	Cornish.....	Cocoon.
Oak fig gall, <i>Biorhiza forticornis</i> .....	Aug.	21 White oak.....	Woodfords .....	Galls common.
Pear slug, <i>Eriocampoides timacina</i> .....	Sept.	15 Cherry Quince.....	Lewiston.....	Larvæ.
Mossy rose gall, <i>Rhodites rosea</i> .....	Oct.	10 Rose .....	Castine .....	Galls with larvæ.
Maple spot gall, <i>Scyara ocellata</i> .....	June	29 Maple.....	Hancock Point.....	Numerous.
Comb-horned fish-fly, <i>Chaulioides pectinicornis</i> .....	July	13 .....	Gardiner.....	Adult.

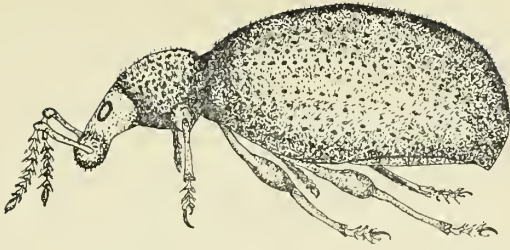


FIG. 11. Strawberry crown girdler. Adult x 8.

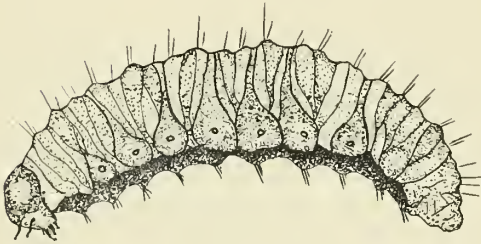


FIG. 12. Strawberry crown girdler. Larva x 8.

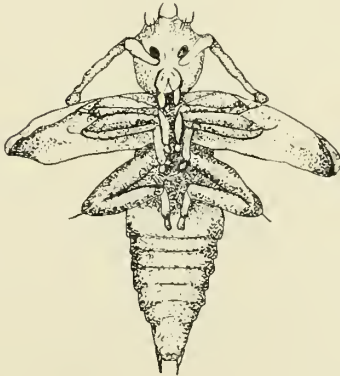


FIG. 13. Strawberry crown girdler. Pupa x 8.







FIG. 14. Nest of brown-tail moth, containing no eggs but many small caterpillars.



FIG. 15. Cocoon, eggs and caterpillar of tussock moth.



FIG. 16. Red-humped caterpillar.







FIG. 17. Chain-dotted geometer.



FIG. 18. Hickory tiger moth.



FIG. 19. Moth of yellow-necked caterpillar.





FIG. 20. Mourning cloak butterfly.



FIG. 21. Work of rose-chaffer in apples.





## CONCERNING INSECTS FOR IDENTIFICATION.

---

In order that the Station may keep in touch with the insect situation in different parts of the State, it is exceedingly desirable that specimens from different localities should be received for identification. Frequently it happens that a species concerning which some fact is yet unknown will occur in such numbers in a certain locality that it can be studied easily there, although it may be rare in other parts of the State, and news of an occurrence like this is always helpful. Insects which are sent to the Station furnish data concerning the extent of injury by species long known to be present in the State, their spread and often the parasites attending them. Also there are many insects troublesome in other states (conspicuous among them the gypsy moth and the San Jose scale) which have not yet been found in Maine. It is important that such pests should be discovered as soon as possible after their arrival.

### DIRECTIONS FOR SENDING SPECIMENS.

All inquiries about insects, injurious or otherwise, should be accompanied by specimens, the more the better. Such specimens, if dead, should be packed in tissue paper or cotton and inclosed in a box. Dead specimens, if particularly soft, may be packed in cotton saturated in alcohol. Whenever it is possible, larvæ (i. e., grubs, caterpillars, maggots, etc.,) should be packed alive in a box together with a supply of their food. Air holes are never needed for the journey, no matter how tight the box. It is often of great practical importance to have accompanying the specimens such particulars as where and when the insect was found, whether it seemed to be destroying leaves, buds, or stem, how long it has been known to the sender, and the amount of damage it has done.

Packages go by mail for one cent per ounce. They should bear the name of the sender and be addressed,  
MAINE AGRICULTURAL EXPERIMENT STATION,  
ORONO, MAINE.



